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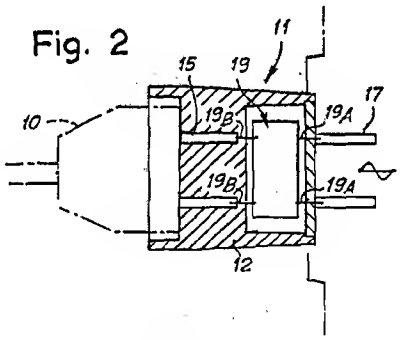
(54) Adaptor for electrical equipment with incorporated controller

(57) The adaptor device for the connection of an electrical load (1) to a power socket (13) of a distribution network comprises a set of contacts (17) for the connection to the socket (13), a set of contacts (15) for the connection to a plug (10) of the electrical load and, between the said contacts (17) for the connection to the socket (13) and the said contacts (15) for the connection to a plug, a control circuit (19) to control the power supplied to the said electrical load (1).

Fig. 2



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Description

The invention relates to an adaptor for the connection of electrical equipment, and in particular (but not exclusively) light fittings, to an electrical power socket.

There exist light fittings, particularly of the halogen lamp type, fitted with intensity controllers (known as "dimmers") which enable the luminous intensity of the lamp to be regulated as desired. In some cases, these intensity controllers are fitted in place of the normal wall switches and may be used in combination with existing lamps. However, they can only be used when the equipment is controlled by a wall switch, for example in the case of light fittings suspended from the ceiling.

In other cases, particularly in what are known as standard lamps, in other words lamps resting on the ground, a switch incorporating the intensity controller is provided by the manufacturer of the equipment.

In many other cases, however, the light fitting is provided with an on-off switch or a switch with a maximum of two positions, which allows the luminous intensity to be changed between two fixed values. This is the case in certain low-voltage halogen table lamps.

The object of the present invention is to provide a universal device which enables intensity control to be provided even in light fittings not equipped with such control, and, more generally, enables a power controller to be provided for any electrical load.

According to an improvement of the present invention, a further object is that of providing a luminous intensity control or power control device for any electrical load, which permits remote control or automatic control in accordance with an external physical parameter, for example the variation of the intensity of natural light or the presence of a person in the environment in which the light fitting with which the device is associated is located.

Substantially, according to the invention, an adaptor device is provided for the connection of an electrical load, for example a light fitting, to a power socket of a distribution network, comprising a set of contacts for the connection to the socket, a set of contacts for the connection to a plug of the electrical load and, between the said contacts for the connection to the socket and the said contacts for the connection to a plug, a control circuit to control the power to the said electrical load. A device of this type may be interposed between the plug of any light fitting and any socket of the electrical installation, enabling the light fitting to be converted into a variable-intensity lamp.

For greater convenience and practicality, according to a particularly advantageous embodiment, the contacts for the connection to the socket and to the plug, as well as the control circuit, are incorporated in a substantially rigid housing shaped in a similar way to ordinary adaptors used to adapt plugs of one shape to sockets of a different and non-complementary shape (for example, to adapt European plugs to US sockets, or vice versa).

In one particularly simple embodiment, the control circuit may be controlled by a manual control means. However, according to a preferred embodiment, the adaptor device has means which permit remote control of the luminous intensity, in response to an environmental parameter or in response to a voluntary control signal. For this purpose, in one embodiment the control circuit comprises a receiver for a control signal sent by a transmitter, the said signal acting on the control circuit, typically by means of a microprocessor, to control the luminous intensity of the said light fitting.

Control may be provided by means of a digital line (digital bus) for data transmission, instead of by a remote control system. A solution of this type may be particularly useful in installations controlled by a central processor.

Alternatively, or in combination, the control circuit may be made to comprise a sensor module and a controller; in this case, the sensor module controls the controller in accordance with a physical parameter of the environment in which the device is positioned, for example in accordance with the luminosity or with the presence or absence of a person in the environment.

Further advantageous characteristics of the invention are indicated in the attached claims.

The invention will be more clearly understood from the description and the attached drawing, which shows a non-restrictive embodiment of the invention. In the drawing,

Fig. 1 shows schematically the application of the device according to the invention to a standard lamp;

Fig. 2 shows a schematic longitudinal section through the device; and

Figs. 3 and 4 show two block diagrams of the control circuit of the device according to the invention.

Fig. 1 shows by way of example the application of the device to a lamp of the type known as a standard lamp, indicated in a general way by the number 1 and provided with a base 3 and an upright 5 terminating at its top in a cap 7 in which the lamp is housed. The lamp 1 is connected by a power supply cable 9 to an adaptor 11 (forming the subject of the present invention) interposed between the plug 10 and the wall socket 13.

The adaptor device 11 is shown schematically in section in Fig. 2. It has a housing 12 in which a female connector portion 15 designed to receive the contacts of the plug 10 of the light fitting 1 is located. On the opposite side, a pair of contacts 17 designed to be inserted into the corresponding locations of the socket 13 projects from the housing 12 of the adaptor device. An adaptor designed to be used with a type of socket and a type of plug commonly used in European countries is illustrated in the example shown in the drawing. It is also evident that the contacts 17 and the female connector portion 15 may vary in accordance with the type of plug and socket used in each individual country and in accordance with the safety regulations in force

there. It is also possible to envisage the provision of a female connector 15 and contacts 17 which are different from each other, enabling the adaptor device 11 to be used as a means of adapting a plug 11 of one type (European, for example) to a socket (13) of a different type (US, for example).

Inside the adaptor device 11 there is located an intensity control circuit indicated in a general way by the number 19. The device may be a conventional device with the control provided by means of a potentiometer or other manually controlled system, as commonly used in intensity control switches fixed to walls. The circuit 19 has the two input poles 19A electrically connected to the two contacts 17 and the two output poles 19B electrically connected to the electrical contacts of the female connector 15. In this way, the alternating mains current, typically at 220 V and 50 Hz, is present at the input of the control circuit 19, while a current whose characteristics vary as a function of the regulation which can be provided by the control circuit 19 is present at the output of the circuit 19.

Fig. 3 is a block diagram of the control circuit 19 with remote-control operation. In this case, the control circuit 19 has a series controller 21, controlled by a microprocessor 23, which receives and interprets the signals transmitted by a transmitter 26 and received by a receiver 25. The transmitter 26 may be a radio transmitter or one using infra-red radiation. In the first case, the operation is more advantageous since it is not affected by the presence of obstacles interposed between the transmitter and the receiver. With the transmitter 26 it is possible to send to the circuit 19 contained in the adaptor device an on or off signal and a signal for controlling the luminous intensity of the lamp which is achieved, for example, by modifying the power supply voltage leaving the circuit 19.

Alternatively, the circuit 19 may be connected to a digital interface rather than to a receiver module. The interface connects the control circuit 19 to a digital line (digital bus) connected to a central processor. This solution is shown in broken lines, also in Fig. 3, where the block 25 (representing the interface in this case) is connected to a digital bus 28.

Fig. 4 is a block diagram of a solution in which the series controller 21 is connected to a sensor module 27 whose actual sensor, disposed advantageously outside the casing of the adaptor device 11, is indicated by the number 29. The sensor 29 may be a luminosity sensor which detects the luminosity of the environment. According to the signal detected by the sensor 29 and interpreted by the module 27 (which also receives a reference signal if necessary) the controller 21 is controlled in such a way that it has at its output a voltage corresponding to the desired level of luminous intensity of the lamp. A manual correction system of a known type, by means of which the reference signal may be set, may also be provided.

The luminosity sensor 29 and the sensor module 27 are known and do not require further description in this text.

The sensor 29 may also be a proximity sensor, which causes the lamp to light when a person enters the environment. The intensity may be controlled in this case, for example, by means of a remote control system by means of which the reference signal is set. In this case, the two circuits shown in Figs. 3 and 4 may be combined.

It is to be understood that the drawing shows only an example provided solely as a practical demonstration of the invention, and that this invention may vary in its forms and arrangements without departure from the scope of the guiding concept of the invention. For example, the light fitting may be replaced by another type of electrical load whose power supply is to be controlled. Any presence of reference numbers in the enclosed claims has the purpose of facilitating the reading of the claims with reference to the description and to the drawing, and does not limit the scope of protection represented by the claims.

Claims

1. An adaptor device for the connection of an electrical load (1) to a power socket (13) of a distribution network, comprising a set of contacts (17) for the connection to the socket (13), a set of contacts (15) for the connection to a plug (10) of the electrical load and, between the said contacts (17) for the connection to the socket (13) and the said contacts (15) for the connection to a plug, a control circuit (19) to control the power to the said electrical load (1).

2. Device as claimed in Claim 1, in which the contacts (15, 17) and the control circuit (19) are incorporated in a substantially rigid housing (12).

3. Device as claimed in Claim 1 or 2, in which the said control circuit (19) is controlled by a manual control means.

4. Device as claimed in Claim 1 or 2, in which the said control circuit (19) comprises a receiver (25) for a control signal sent by a transmitter (26), the said signal acting on the control circuit (19) to control the power supplied to the said electrical load.

5. Device as claimed in Claim 4, in which the said control circuit also comprises a microprocessor (23) which interprets the signals received from the said receiver (25) and controls a controller (21).

6. Device as claimed in Claim 1 or 2, comprising a microprocessor (23) connected to a controller (21) and to an interface (25) for connection to a digital line (28).

7. Device as claimed in Claim 1 or 2, in which the said

control circuit comprises a sensor module (27) and a controller (21) and in which the said sensor module (27) controls the said controller in accordance with a physical parameter of the environment in which the device (11) is positioned.

8. Device as claimed in Claim 7, in which a reference signal is supplied to the said control circuit.

9. Device as claimed in Claim 8, in which the said reference signal is provided by a manual control system or by a control signal by means of a remote control system (26) or by a signal from a digital line (28).

10. Device as claimed in one or more of the preceding claims, in which the said electrical load is a light fitting and in which the control circuit (19) controls the luminous intensity of the said light fitting.

11. Device as claimed in Claim 10, in which the said sensor module detects the luminosity of the said environment or the presence of a person in the said environment.